epd-norge
Global program operatør

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

COSMO APEX 4000 HF LT PR/PC



Glamox

The Norwegian EPD Foundation

Owner of the declaration:
Glamox AS

Product:
COSMO APEX 4000 HF LT PR/PC

Declared unit:
1 pcs

This declaration is based on Product Category Rules:
CEN Standard EN 15804:2012+A2:2019 serves as core PCR
IBU PCR - Part B for luminaires, lamps, and components for luminaires

Program operator:
The Norwegian EPD Foundation

Declaration number:

Registration number:

Issue date:

Valid to:

EPD Software:
LCA.no EPD generator ID: 179841

General information

Product

COSMO APEX 4000 HF LT PR/PC

Owner of the declaration:

Glamox AS
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Program operator:

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The Norwegian EPD Foundation
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Manufacturer:

Glamox AS
Birger Hatlebakks veg 15
6415 Molde, Norway

Declaration number:

Place of production:

Glamox production site Wilkasy (Poland)
Olsztynska 2
11-500 Wilkasy, Poland

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
IBU PCR - Part B for luminaires, lamps, and components for luminaires

Management system:

ISO 9001, ISO 14001; Molde: ATEX, ISO 80079-34 (IECEx), ISO45001; Kirkenær: ISO 13485; Keila: ISO 45001, ISO 50001; Dobczyce: ATEX, ISO 80079-34 (IECEx), Module D 2014/90/EU

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Organisation no:

912007782

Declared unit:

1 pcs COSMO APEX 4000 HF LT PR/PC

Issue date:

Declared unit with option:

A1,A2,A3,A4,A5,B6,C1,C2,C3,C4,D

Valid to:

Year of study:

2022

Functional unit:

1pc Cosmo Apex luminaire manufactured in Glamox Wilkasy. Transport to customer, installed and used acc. to a specific lighting regime over 20years lifetime. Including waste treatment at end-of-life.

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPD-Norway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools

Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2021.09, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD Norway. NEPDT42

Developer of EPD: Bartlomiej Sek

Reviewer of company-specific input data and EPD: Malgorzata Floryanska

Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools. Approval number: NEPDT41.

Approved:

Third party verifier:

Vito D'Incognito, Take Care International

(no signature required)

Product

Product description:

COSMO APEX is a versatile and robust luminaire which makes it suitable in a wide range of applications. The diffuser and housing are made of recyclable, self-extinguishing, UV-stabilized polycarbonate with mounting brackets and diffuser clips in stainless steel. COSMO APEX is easily mounted to ceiling or wall. Can also be pendant mounted with suspension wire.

This environmental product declaration can be used for the following luminaires:
CSA578853 - COSMO APEX GR 4000 HF 840 LT PR/PC
CSA578850 - COSMO APEX GR 4000 HF 830 LT PR/PC
CSA594434 - COSMO APEX BL 4000 HF 840 LT PR/PC
CSA595455 - COSMO APEX BL 4000 HF 830 LT PR/PC

Product specification

Materials	kg	%
Coating materials	0,03	2,25
Electronic - Connector	0,01	0,58
Electronic - LED chip	0,00	0,19
Electronic - LED driver	0,17	12,06
Electronic - LED plate	0,08	5,81
Electronic - Resistor	0,00	0,02
Electronic - Wire	0,02	1,31
Metal - Stainless steel	0,14	10,09
Metal - Steel	0,32	23,57
Plastic - Polyamide	0,00	0,18
Plastic - Polycarbonate (PC)	0,57	41,55
Plastic - Polyethylene terephthalate (PET)	0,01	1,03
Plastic - Polyurethane (PUR)	0,02	1,09
Thermoplastic elastomers (TPE)	0,00	0,28
Total	1,38	

Packaging	kg	%
Packaging - Cardboard	0,07	90,98
Packaging - Paper	0,01	7,36
Packaging - Plastic	0,00	1,65
Total incl. packaging	1,45	

Technical data:

Please visit the product page on our website for more technical information
https://www.glamox.com/en/pbs/products/indoor/industry/cosmo-apex/

Market:

Europe

Reference service life, product

20 years lifetime for the installation according to the used scenario

Reference service life, building or construction works

60 years. Standard service life for buildings according to PCR Part A of EPD Norway.

LCA: Calculation rules

Declared unit:

1 pcs COSMO APEX 4000 HF LT PR/PC

Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) can be excluded. These cut-off criteria do not apply for hazardous materials and substances.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

Data quality:

Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the raw materials in A1 is presented in the table below.

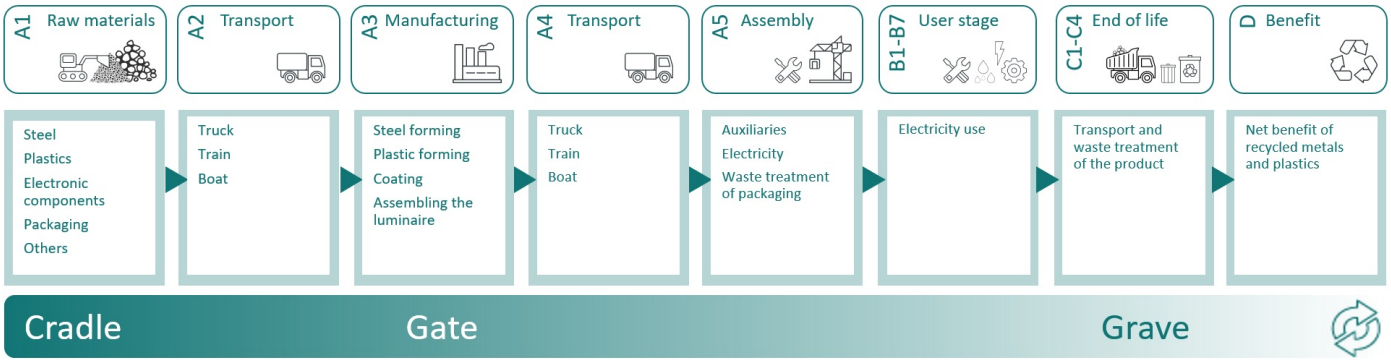
Materials	Source	Data quality	Year
Coating materials	Ecoinvent 3.6	Database	2019
Electronic - Connector	ecoinvent 3.6	Database	2019
Electronic - LED plate	ecoinvent 3.6	Database	2019
Electronic - Resistor	ecoinvent 3.6	Database	2019
Metal - Stainless steel	ecoinvent 3.6	Database	2019
Metal - Steel	ecoinvent 3.6	Database	2019
Packaging - Cardboard	ecoinvent 3.6	Database	2019
Packaging - Paper	ecoinvent 3.6	Database	2019
Packaging - Plastic	ecoinvent 3.6	Database	2019
Plastic - Polyamide	ecoinvent 3.6	Database	2019
Plastic - Polycarbonate (PC)	ecoinvent 3.6	Database	2019
Plastic - Polyethylene terephthalate (PET)	ecoinvent 3.6	Database	2019
Plastic - Polyurethane (PUR)	ecoinvent 3.6	Database	2019
Thermoplastic elastomers (TPE)	ecoinvent 3.6	Database	2019
Metal - Steel	ecoinvent 3.6	Database	2020
Electronic - Wire	Material composition + ecoinvent 3.6	Supplier data + database	2019
Electronic - LED driver	Product composition + ecoinvent 3.6	Supplier data + database	2019
Electronic - LED chip	Scholand et al. (2012) + Ecoinvent 3.6	Scientific literature + database	2017

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Product stage			Construction installation stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	MND	MND	X	MND	X	X	X	X	X

System boundary:

The analysis is a cradle-to-grave study of one luminaire manufactured and installed, used according to a specific lighting regime over a specific lifetime, including waste treatment at end-of-life.
A1-A5 includes the extraction and production of raw materials, transportation to the production site, the production process itself, transport to the market and assembly.
B6 is the operational energy use stage of the luminaire based on a scenario.
C1-C4 includes de-installation of the luminaire, average transport between building site and waste treatment facility, waste processing and disposal. Waste treatment of the product follows the default values provided in EN 50693.
D shows the recyclability of metals and plastics, and allows the producers a credit for the net scrap that is produced at the end of a product's life. The benefits from recycling of net scrap are described in formula from EN 15804:2012+A2:2019. Substitution of heat and electricity generated by the incineration with energy recovery of plastic insulation and other parts is also calculated in module D.



Additional technical information:

Please visit our website www.glamox.com for more technical information.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Module A4: Transport from manufacturing location in Wilkasy to warehouse in Jasin (448 km) + average distribution into the Europe market (300 km).
Module B6: The operational energy use of the luminaire is calculated based on the methodology provided in IBU PCR Part B for luminaires, lamps, and components for luminaires. The energy consumption model for luminaire used in the PCR follows the application scenarios developed in EN 15193:2007. To calculate the electricity use of the luminaire, the following scenario parameters have been applied:
- User scenario = manufacture
- Active power of the luminaire (Pa) = 25 watt
- Passive power of the luminaire (Pp) = 0 watt
- Daylight time usage (tD) = 2500 hours
- Non-daylight time usage (tN) = 1500 hours
- Standard year time (ty) = 8760 hours
- The occupancy depency factor (FO) = 1 (factor, no unit)
- The daylight dependency factor (FD) = 1 (factor, no unit)
- The product specific constant illuminance factor (FCP) = 1 (factor, no unit)
- The non-daylight dimming factor (FN) = 1 (factor, no unit)
- The application specific empiric lifetime of the luminaire in years (a) = 20 years (corresponding to the reference service life of the product)

Module C2: Average transport to Europe waste treatment facilities (300km).
Modules C3 and C4: Waste treatment of the product follows the default values provided in EN 50693, Product Category Rules for life cycle assessments of electronic and electrical products and systems, table G.4. This table specified how different types of raw materials used in A1 will likely be treated during the end-of-life of the product. Waste treatments in C3 include material recycling and incineration with and without energy recovery and fly ash extraction. Disposal in C4 consist of landfilling of different waste fractions and of ashes.
Module D: The recyclability of metals, plastics, and electronic components allows the producers a credit for the net scrap that is produced at the end of a product's life. The benefits from recycling of net scrap are described in formula from EN 15804:2012+A2:2019. Substitution of heat and electricity generated by the incineration with energy recovery of plastic insulation and other parts is also calculated in module D.

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 5 (km) - Europe	36,7 %	748	0,044	l/tkm	32,91

Assembly (A5)	Unit	Value			
Waste, cardboard and paper, to average treatment - A5 including transport (kg)	kg	0,07			
Waste, plastic, mixture, to average treatment - A5 including transport (kg)	kg	0,00			

Operational energy (B6)	Unit	Value			
Electricity, European average (kWh)	kWh/DU	2000,00			

Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 5 (km) - Europe	36,7 %	300	0,044	l/tkm	13,20

Waste processing (C3)	Unit	Value			
Copper to recycling (kg)	kg	0,01			
Steel to recycling (kg)	kg	0,43			
Waste treatment of hazardous waste, incineration with fly ash extraction (kg)	kg	0,03			
Waste treatment of plastic mixture, incineration with energy recovery and fly ash extraction (kg)	kg	0,31			
Waste treatment per kg electronics scrap from LED plate, without components, recycling of copper - C3 (kg)	kg	0,04			
Waste treatment per kg electronics scrap from PWB, with components, recycling of metals - C3 (kg)	kg	0,04			
Waste treatment per kg used electronic components, manual seperation (kg)	kg	0,19			
Waste treatment per kg used PWB, shredding and separation - C3 (kg)	kg	0,17			

Disposal (C4)	Unit	Value			
Landfilling of ashes from incineration of Hazardous waste, process per kg ashes and residues - C4 (kg)	kg	0,01			
Landfilling of ashes from incineration of Plastic mixture, process per kg ashes and residues (kg)	kg	0,01			
Landfilling of copper (kg)	kg	0,00			
Landfilling of hazardous waste (kg)	kg	0,09			
Landfilling of plastic mixture (kg)	kg	0,31			
Landfilling of steel (kg)	kg	0,11			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of copper with net scrap from PWB, without components (kg)	kg	0,00			
Substitution of electricity, in Norway (MJ)	MJ	0,48			
Substitution of primary copper with net scrap (kg)	kg	0,00			
Substitution of primary metals with net scrap from PWB, with components (kg)	kg	0,01			
Substitution of primary steel with net scrap (kg)	kg	0,21			
Substitution of thermal energy, district heating, in Norway (MJ)	MJ	7,24			

LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Environmental impact							
Indicator		**Unit**	A1	A2	A3	A4	A5
	GWP-total	kg CO_2 -eq	2,67E+01	9,52E-02	1,65E+00	1,81E-01	1,23E-01
	GWP-fossil	kg CO_2 -eq	2,67E+01	9,51E-02	1,63E+00	1,81E-01	1,25E-03
	GWP-biogenic	kg CO_2 -eq	-8,59E-03	3,85E-05	1,66E-02	7,37E-05	1,21E-01
	GWP-luluc	kg CO_2 -eq	3,72E-02	3,37E-05	1,35E-03	6,32E-05	3,89E-07
	ODP	kg CFC11 -eq	1,67E-06	2,16E-08	2,41E-07	4,12E-08	2,49E-10
	AP	mol H+ -eq	1,95E-01	4,38E-04	5,03E-03	7,39E-04	5,58E-06
	EP-FreshWater	kg P -eq	3,46E-03	7,40E-07	1,43E-05	1,42E-06	9,67E-09
	EP-Marine	kg N -eq	2,74E-02	1,27E-04	1,44E-03	2,19E-04	1,91E-06
	EP-Terrestial	mol N -eq	3,39E-01	1,41E-03	2,13E-02	2,43E-03	2,00E-05
	POCP	kg NMVOC -eq	9,89E-02	4,24E-04	4,41E-03	7,42E-04	5,76E-06
	ADP-minerals&metals[1]	kg Sb -eq	4,70E-03	2,54E-06	3,31E-06	4,90E-06	2,86E-08
	ADP-fossil[1]	MJ	3,30E+02	1,43E+00	2,41E+01	2,73E+00	1,65E-02
	WDP[1]	m^3	8,91E+02	1,35E+00	5,61E+00	2,60E+00	2,18E-02

Indicator		**Unit**	B6	C1	C2	C3	C4	D
	GWP-total	kg CO_2 -eq	8,56E+02	0,00E+00	7,26E-02	8,58E-01	5,85E-02	-1,04E+00
	GWP-fossil	kg CO_2 -eq	8,48E+02	0,00E+00	7,25E-02	8,58E-01	5,83E-02	-1,04E+00
	GWP-biogenic	kg CO_2 -eq	5,96E+00	0,00E+00	2,96E-05	2,89E-04	2,05E-05	-2,40E-03
	GWP-luluc	kg CO_2 -eq	1,97E+00	0,00E+00	2,54E-05	1,62E-04	1,66E-04	-2,65E-03
	ODP	kg CFC11 -eq	7,18E-05	0,00E+00	1,65E-08	1,26E-08	2,49E-09	-3,06E-03
	AP	mol H+ -eq	4,95E+00	0,00E+00	2,97E-04	4,65E-04	1,29E-04	-5,19E-02
	EP-FreshWater	kg P -eq	9,06E-02	0,00E+00	5,70E-07	3,43E-06	9,14E-07	-3,02E-04
	EP-Marine	kg N -eq	6,29E-01	0,00E+00	8,79E-05	1,35E-04	6,90E-05	-2,89E-03
	EP-Terrestial	mol N -eq	7,75E+00	0,00E+00	9,73E-04	1,44E-03	3,49E-04	-3,88E-02
	POCP	kg NMVOC -eq	1,97E+00	0,00E+00	2,98E-04	3,74E-04	1,46E-04	-1,15E-02
	ADP-minerals&metals[1]	kg Sb -eq	6,22E-03	0,00E+00	1,96E-06	7,02E-07	1,47E-07	-1,14E-03
	ADP-fossil[1]	MJ	1,75E+04	0,00E+00	1,09E+00	8,97E-01	3,25E-01	-1,25E+01
	WDP[1]	m^3	2,63E+05	0,00E+00	1,04E+00	6,68E+00	2,02E+00	-1,69E+01

GWP-total = Global Warming Potential total; GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment: EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

Remarks to environmental impacts

A luminaire is a product that consumes energy during the use phase. Combined with a relatively long expected lifetime and the environmental impact of generating electricity, the use phase (B6) will normally be the most contributing stage to the overall environmental impact of the declared unit. It is important to be aware that the actual calculations of the effect of B6 is particularly sensitive to which use scenario that is chosen and which energy grid mix that is used.

Additional environmental impact indicators

Indicator		Unit	A1	A2	A3	A4	A5
	PM	Disease incidence	1,55E-06	6,77E-09	5,52E-08	1,30E-08	8,30E-11
	IRP[2]	kgBq U235 -eq	1,04E+00	6,25E-03	2,03E-02	1,19E-02	7,08E-05
	ETP-fw[1]	CTUe	1,56E+03	1,05E+00	3,59E+01	2,01E+00	2,19E-02
	HTP-c[1]	CTUh	4,22E-08	0,00E+00	6,23E-10	0,00E+00	1,00E-12
	HTP-nc[1]	CTUh	1,22E-06	1,14E-09	1,37E-08	2,17E-09	2,70E-11
	SQP[1]	dimensionless	8,65E+01	9,74E-01	1,35E+02	1,88E+00	1,15E-02

Indicator		Unit	B6	C1	C2	C3	C4	D
	PM	Disease incidence	1,30E-05	0,00E+00	5,22E-09	3,66E-09	2,32E-09	-1,40E-07
	IRP[2]	kgBq U235 -eq	1,53E+02	0,00E+00	4,78E-03	4,19E-03	9,63E-04	-3,93E-02
	ETP-fw[1]	CTUe	1,23E+04	0,00E+00	8,06E-01	3,86E+00	7,01E+01	-3,83E+02
	HTP-c[1]	CTUh	3,42E-07	0,00E+00	0,00E+00	9,08E-10	8,90E-11	-3,21E-09
	HTP-nc[1]	CTUh	1,18E-05	0,00E+00	8,70E-10	4,95E-08	7,60E-10	-1,27E-07
	SQP[1]	dimensionless	4,23E+03	0,00E+00	7,54E-01	2,50E-01	8,88E-01	-1,17E+01

PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Potential Soil Quality Index (dimensionless)

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator
2. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Resource use							
Indicator		**Unit**	A1	A2	A3	A4	A5
	PERE	MJ	3,12E+01	2,00E-02	3,10E+01	3,85E-02	2,76E-04
	PERM	MJ	6,17E-01	0,00E+00	0,00E+00	0,00E+00	-7,45E-01
	PERT	MJ	3,18E+01	2,00E-02	3,10E+01	3,85E-02	-7,45E-01
	PENRE	MJ	3,26E+02	1,43E+00	2,41E+01	2,73E+00	1,65E-02
	PENRM	MJ	1,89E+01	0,00E+00	0,00E+00	0,00E+00	-5,10E-02
	PENRT	MJ	3,30E+02	1,43E+00	2,41E+01	2,73E+00	-3,44E-02
	SM	kg	3,62E-01	0,00E+00	2,20E-05	0,00E+00	0,00E+00
	RSF	MJ	3,49E-01	7,15E-04	5,01E-03	1,38E-03	9,08E-06
	NRSF	MJ	7,33E-01	2,54E-03	7,13E-03	4,92E-03	3,70E-05
	FW	m^3	2,52E-01	1,49E-04	1,13E-03	2,87E-04	7,82E-06

Indicator		**Unit**	B6	C1	C2	C3	C4	D
	PERE	MJ	3,39E+03	0,00E+00	1,54E-02	1,38E-01	8,18E-02	-4,85E+00
	PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PERT	MJ	3,39E+03	0,00E+00	1,54E-02	1,38E-01	8,18E-02	-4,85E+00
	PENRE	MJ	1,75E+04	0,00E+00	1,09E+00	8,97E-01	3,25E-01	-1,25E+01
	PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	-1,99E+01	0,00E+00	0,00E+00
	PENRT	MJ	1,75E+04	0,00E+00	1,09E+00	-1,90E+01	3,25E-01	-1,25E+01
	SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,47E-03	2,92E-03
	RSF	MJ	2,47E+02	0,00E+00	5,52E-04	2,45E-03	3,55E-04	8,16E-03
	NRSF	MJ	5,87E+01	0,00E+00	1,97E-03	-4,95E-05	1,66E-02	2,93E-02
	FW	m^3	1,49E+01	0,00E+00	1,15E-04	1,52E-03	2,69E-04	-1,25E-02

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Waste

Indicator		Unit	A1	A2	A3	A4	A5
	HWD	kg	1,15E-01	7,27E-05	3,14E-02	1,39E-04	0,00E+00
	NHWD	kg	3,77E+00	6,74E-02	3,48E-01	1,30E-01	7,25E-02
	RWD	kg	8,19E-04	9,76E-06	3,01E-05	1,86E-05	0,00E+00

Indicator		Unit	B6	C1	C2	C3	C4	D
	HWD	kg	2,64E+00	0,00E+00	5,58E-05	2,35E-05	9,16E-02	-4,15E-03
	NHWD	kg	5,93E+01	0,00E+00	5,23E-02	6,29E-02	4,32E-01	-2,45E-01
	RWD	kg	1,25E-01	0,00E+00	7,46E-06	1,20E-06	7,33E-07	-3,38E-05

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Output flow

Indicator		Unit	A1	A2	A3	A4	A5
	CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	MFR	kg	1,20E-03	0,00E+00	3,76E-01	0,00E+00	6,70E-02
	MER	kg	1,02E-05	0,00E+00	2,43E-06	0,00E+00	4,99E-03
	EEE	MJ	3,53E-05	0,00E+00	7,75E-02	0,00E+00	4,08E-03
	EET	MJ	5,34E-04	0,00E+00	1,17E+00	0,00E+00	6,17E-02

Indicator		Unit	B6	C1	C2	C3	C4	D
	CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	MFR	kg	0,00E+00	0,00E+00	0,00E+00	4,39E-01	2,90E-05	-1,14E-04
	MER	kg	0,00E+00	0,00E+00	0,00E+00	3,42E-01	1,49E-05	-1,51E-05
	EEE	MJ	0,00E+00	0,00E+00	0,00E+00	4,78E-01	1,70E-04	-3,69E-05
	EET	MJ	0,00E+00	0,00E+00	0,00E+00	7,24E+00	2,57E-03	-5,58E-04

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

Biogenic Carbon Content

Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in accompanying packaging	kg C	3,31E-02

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2

Additional requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

Electricity mix	Data source	Amount	Unit
Electricity, medium voltage, biomass and wind based with guarantee of origin, 01.2022-12.2022, Poland, Wilksay (kWh) - GLAMOX	Ecoinvent 3.6	60,06	g CO2-eq/kWh

Dangerous substances

The product contains no substances given by the REACH Candidate list.

Indoor environment

Not relevant

Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products						
Indicator	**Unit**	A1	A2	A3	A4	A5
GWPIOBC	kg CO_2 -eq	2,68E+01	9,52E-02	1,61E+00	1,81E-01	1,16E-03

Indicator	**Unit**	B6	C1	C2	C3	C4	D
GWPIOBC	kg CO_2 -eq	9,18E+02	0,00E+00	7,26E-02	8,58E-01	5,42E-03	-1,16E+00

GWP-IOBC: Global warming potential calculated according to the principle of instantaneous oxidation. In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

Bibliography

ISO 14025:2010. Environmental labels and declarations - Type III environmental declarations - Principles and procedures. International Organization for Standardization.
ISO 14044:2006. Environmental management - Life cycle assessment - Requirements and guidelines. International Organization for Standardization.
EN 15804:2012+A2:2019. Environmental product declaration - Core rules for the product category of construction products. European Committee for Standardization.
ISO 21930:2017. Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products. International Organization for Standardization.
EN 50693:2019. Product category rules for life cycle assessments of electronic and electrical products and systems. European Committee for Standardization.
Ecoinvent v3, 2019. Allocation, cut-off by classification. Swiss Centre of Life Cycle Inventories.
Iversen et al., (2021). eEPD v2021.09, background information for EPD generator tool system verification, LCA.no. Report number: 07.21. System verification report.
Philis et al., (2022). EPD generator for IBU PCR part B for luminaires, lamps, and components for luminaires, background information for EPD generator application and LCA data, LCA.no. Report number: 04.22. PCR verification report.
EPD Norway (2022). NPCR Part A: Construction products and services. The Norwegian EPD foundation. Version 2.0 published 24.03.2021.
IBU (2017). PCR part B for luminaires, lampes and components for luminaires. Institut Bauen und Umwelt e.V. Version 1.7, published 30.11.2017.

Life cycle inventory (LCI) report for COSMO APEX 4000 HF LT PR/PC, Glamox, August 2023

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